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PHYTOSOCIOLOGICAL STUDIES ON TABLE MOUNTAIN, SOUTH AFRICA:

1. THE BACK TABLE

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Abstract

The Braun-Blanquet phytosociological technique was used to describe the vegetation of a portion of the Back Table of Table Mountain. The fynbos vegetation was found to consist of two communities, one containing five sub-communities, while some patches of wet Kloof Forest occurred in well protected sites. Environmental factors, notably the moisture régime, were found to be important in determining the distribution of the plant communities.

Uittreksel

FITOSOSIOLOGIESE STUDIES OP TAFELBERG, SUID-AFRIKA:
1. DIE AGTERTAFEL

Die Braun-Blanquet fitososiologiese tegniek was gebruik om die plantegroei van 'n gedeelte van die Agtertafel van Tafelberg te beskryf. Dit het geblyk dat die fynbos plantegroei uit twee gemeenskappe bestaan, die een met vyf subgemeenskappe. Lappe klam kloofbos is op goed beskutte plekke gevind. Omgewingsfaktore, hoofsaaklik die beskikbaarheid van water, is as belangrike bepalende faktore vir die verspreiding van plantegroei gevind.

Introduction

The Back Table of Table Mountain (see Fig. 1) is covered by relatively unspoilt fynbos vegetation, when compared to the rest of the Mountain or even the entire Cape Peninsula.

The Back Table plateau is about 600 to 700 m above sea-level and about 200 ha in area (Fig. 2). It is divided by Disa Gorge and two reservoirs (Hely-Hutchinson and Woodhead).

It was decided that a phytosociological survey would contribute to an understanding of the vegetation of the Back Table, and that this survey would also be of use in a concurrent project concerned with the management and ecological status of the vegetation of the whole of Table Mountain (Moll and Campbell, 1976).

Climate

Rainfall records from Table Mountain indicate that the highest annual precipitation on the Mountain occurs at Table Mountain House on the Back Table

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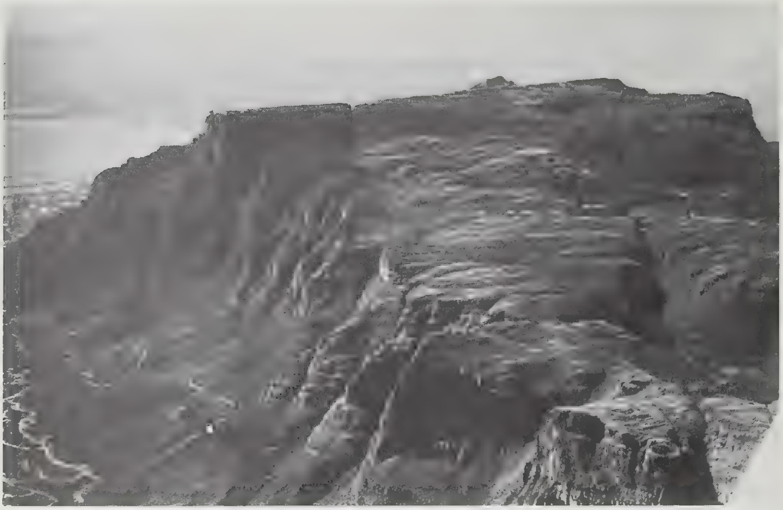

Fig. 1.

Oblique aerial view, facing North, showing the Western escarpment on the left and Disa Gorge dividing the Back Table on the right-hand side. The two reservoirs and dense *Pinus pinaster* stands are just visible above the gorge.

(Schulze, 1965). The 1 780 mm annual precipitation comprises mainly winter rainfall, though mist in summer is frequent. The western slopes and Camps Bay by comparison receive 618 mm per annum, and Kirstenbosch on the eastern side receives 1 413 mm (see Fig. 3).

The mediterranean climatic zone of the Southwestern Cape with cool, wet winters and characteristically hot, dry summers, means that the greatest water shortage and heat stress on plants is imposed during the months January to March.

GEOLOGY AND SOILS

The underlying rock on almost the entire Mountain is Table Mountain Sandstone (Du Toit, 1954). Bedrock is often exposed. Soils vary in colour and are generally of a sandy consistency with little humus, though occasionally soil litter is locally abundant.

METHODS

The survey was carried out during the months March to June 1975 and for purposes of this survey only perennially identifiable species were recorded. Forty-eight relevés were sampled using the Braun-Blanquet technique as described by Werger (1974). Optimal plot size was considered to be 5 × 5 m for vegetation of a metre or less in height. Occasionally larger plots, 5 × 10 m and 10

× 10 m (e.g. in Kloof Forest), were used. All data collected in the field (both environmental and floristic) were entered on a pre-printed field data sheet.

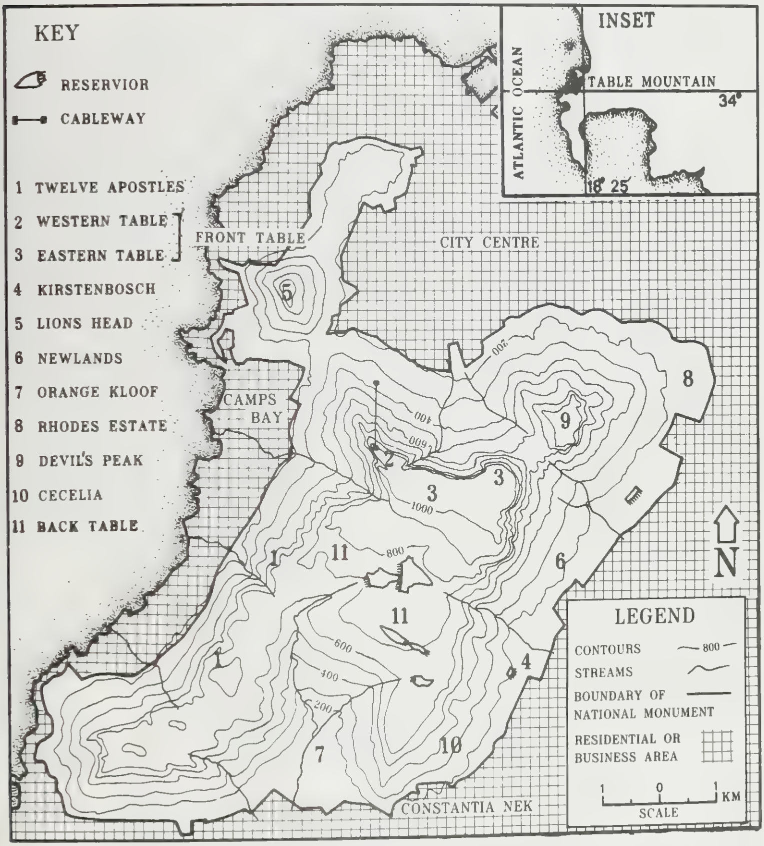

FIG. 2.

Topographic map of Table Mountain National Monument showing the location of the Back Table. Inset shows the position of Table Mountain on the Cape Peninsula.

The floristic data were sorted using a group-average method based on the Canberra similarity coefficient (Campbell and Moll, 1976). This was used to obtain relevé groups. The species were then subjectively re-arranged, and a final phytosociological table was constructed (Table 1). This classification was checked in the field and found to be consistent.

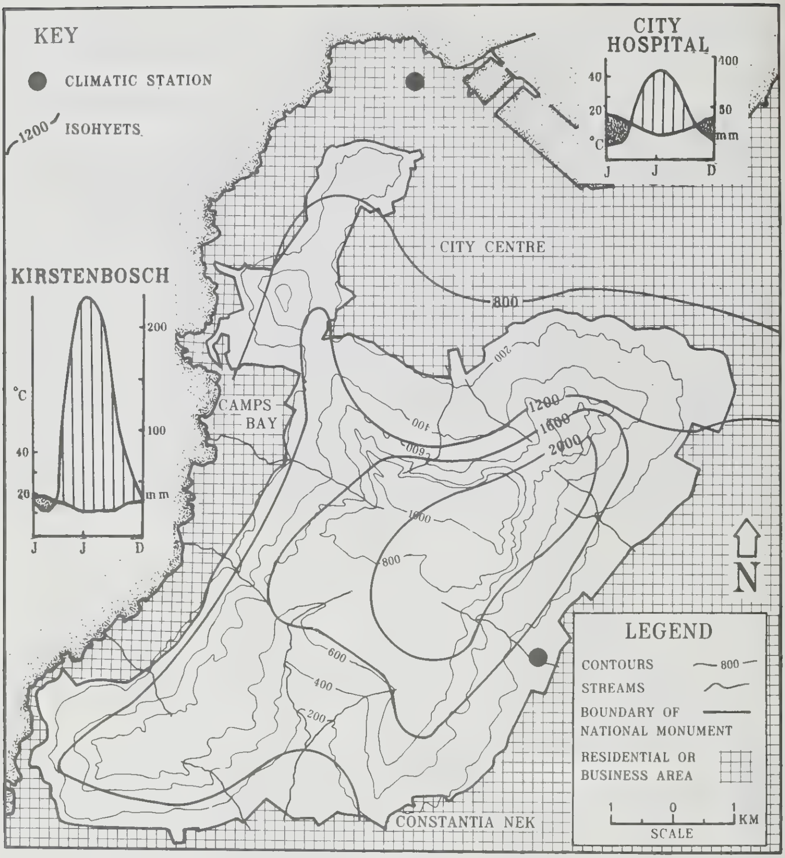

Fig. 3.

Map of the Table Mountain National Monument showing the major rainfall isohyets. Inset climate diagrams indicate the duration and intensity of wet and dry seasons for two stations representative of the climatic extremes of the area.

Classification of the Vegetation

Three major plant communities occur on the Back Table:

1. *Ilex-Blechnum* Forest Community

This contains all the typical members of wet kloof forests in the Southwestern Cape, i.e. *Cunonia capensis, Ilex mitis* and *Halleria lucida* as canopy trees, and *Maytenus acuminata, Podocarpus latifolius* and *Olea capensis* as sub-canopy trees. The ground layer has a high cover of *Blechnum attenuatum* in relevé 55 (situated in Disa Gorge), and *Schoenoxiphium lanceum* in relevé 48 (situated in a deep rock crevice east of Disa Gorge). Associated with both these relevés is *Asparagus scandens* which is generally ubiquitous in forest (Campbell and Moll, 1977). There is a constant stream of water through the gorge draining from Woodhead Reservoir, hence the presence of *B. attenuatum* and *Alsophila capensis*. It is disturbing to note that *Acacia melanoxylon*, a pestplant (Moll and Campbell, 1976), was also recorded here.

2. *Penaea-Erica* Fynbos Community

The five sub-communities of the *Penaea-Erica* Fynbos Community all contain one or more of the following five species: *Penaea mucronata, Erica hispidula, Watsonia* spp., *Hypodiscus aristatus* and *Clutia polygonoides*. This community occurs on both shallow and deep soils with little or much rock cover. With the exception of sub-community E, which is essentially a wetter sub-community, the *Penaea-Erica* Fynbos Community occurs on those seasonally moist to wet soils that show some flow of water through them. It is the most extensive community on the Back Table and varies from having a high component of forest species present where there is some protection from fire, to having a dry component present on well drained, exposed sites.

(i) *Sub-Community A* has as differential species such forest elements (Campbell and Moll, 1977) as *Rhus lucida*/*R. mucronata* and *Myrsine africana*, riverine

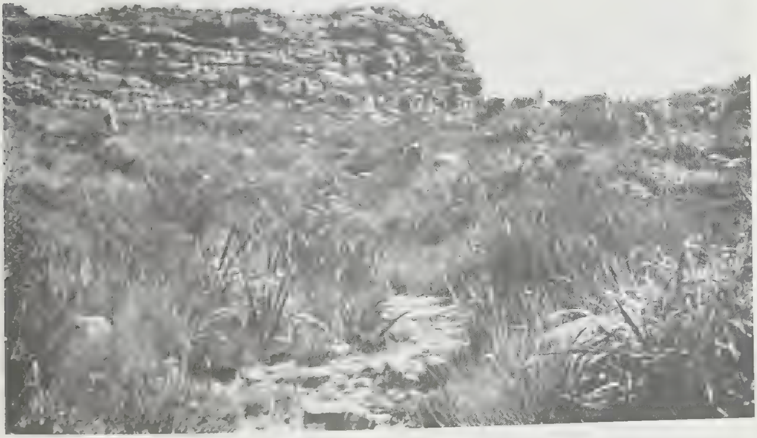

FIG. 4.

Sub-community C showing *Tetraria thermalis* and *Watsonia* spp. as well as tussocked restios such as *Hypodiscus aristatus*.

elements such as *Myrica humilus/M. diversifolia*, and *Psoralea aphylla*, and fynbos elements such as *Leucadendron strobilinum* and *Protea cynaroides*. Because of the presence of the forest elements the sub-community is placed adjacent to the *Ilex-Blechnum* Community on Table 1.

(ii) *Sub-community B* is a depauperate form of sub-community A, probably as a result of more frequent burning as indicated by the presence of such species as *Tetraria thermalis* and *Bobartia gladiata* (Fig. 4). Both sub-community A and B occur on shallow to deep, rocky soils.

(iii) *Sub-community C* is apparently intermediate between sub-communities A and B, the wetter sub-community E, and sub-community D which is the driest sub-community of the *Penaea-Erica* Fynbos Community (Fig. 7).

Bedrock is exposed in all relevés except 180, which had a high cover abundance of *Pinus pinaster*, a non-indigenous tree species. Relevé 180 had only 14 species (average for C is 22,5) and it is suggested that relevé 180 may have been in sub-community A if *P. pinaster* was absent.

The species that distinguish sub-community C as a nodum in the phytosociological table are essentially those that dominate with frequent burning, namely *Tetraria thermalis, Bobartia gladiata, Corymbium glabrum* and *Psoralea aculeata*.

(iv) *Sub-community D* is a drier form of sub-community C occurring on shallower, rocky, well drained soils in exposed situations. The differential species

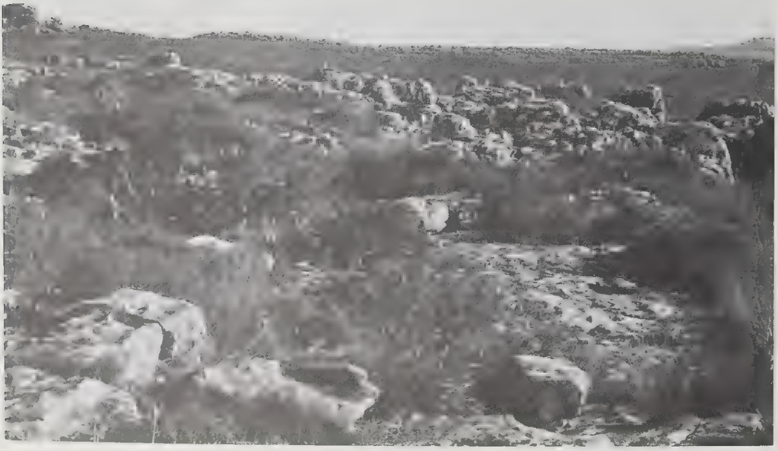

FIG. 5.
Cliffortia ruscifolia and *Lampranthus falciformis* on shallow, rocky, well-drained soils.

is *Lampranthus falciformis*, and *Cliffortia ruscifolia* is also present in every relevé (see Fig. 5).

(v) *Sub-community E* occurs on wetter sites with relatively deep soils. Two variations are apparent, one on soils with a low rock cover, and one on soils with an intermediate rock cover. This sub-community is related to the second fynbos community recognised on the Back Table, namely the *Erica mollis* Fynbos Community, but because of the presence of such species as *Penaea mucronata, Erica hispidula* and *Hypodiscus aristatus* it is classified as part of the *Penaea-Erica* Fynbos Community.

3. *Erica mollis* Fynbos Community

The differential species of this community are *Erica mollis, Restio compressus* and *Bulbinella floribunda*. The community occurs on deep, wet, poorly drained soils. Where the drainage is better this community abutts on to the wetter variation of sub-community E (i.e. E^2) of the *Penaea-Erica* Community and species which are common to the two communities are *Hypolaena crinalis* (Fig. 6) and *Elegia thyrsiflora*. Some species, such as *Villarsia ovata* and *Chondropetalum mucronatum*, are even more widespread and also occur in the drier variation of sub-community E (i.e. E^1).

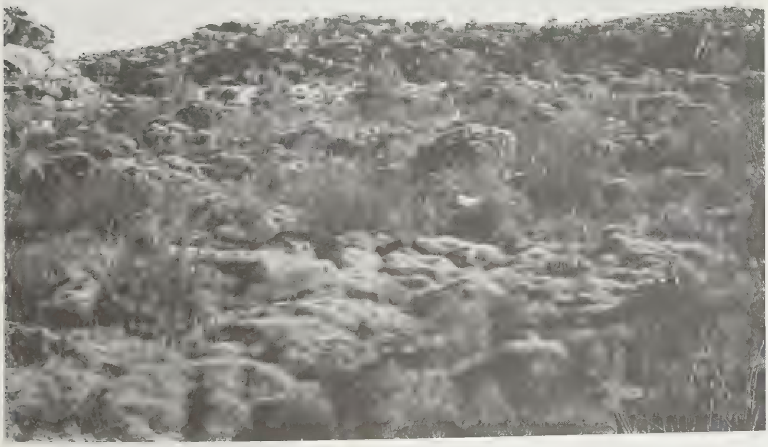

FIG. 6.
Hypolaena crinalis with *Chondropetalum mucronatum* (large tussocks) in a wet area. Note the pines in the background.

CONCLUSIONS

1. The Braun-Blanquet phytosociological technique and the computerised sorting method of Campbell and Moll (1976) are well suited to the survey of fynbos vegetation on the Back Table.

2. The apparently uniform fynbos vegetation of the Back Table was found to be composed of two communities; one containing five sub-communities.

3. These communities and sub-communities are linked to environmental factors, especially the moisture régime, as may be expected on a plateau where aspect is not important.

4. The relationships between the major plant communities and the environmental factors are best summarised diagrammatically (Fig. 7).

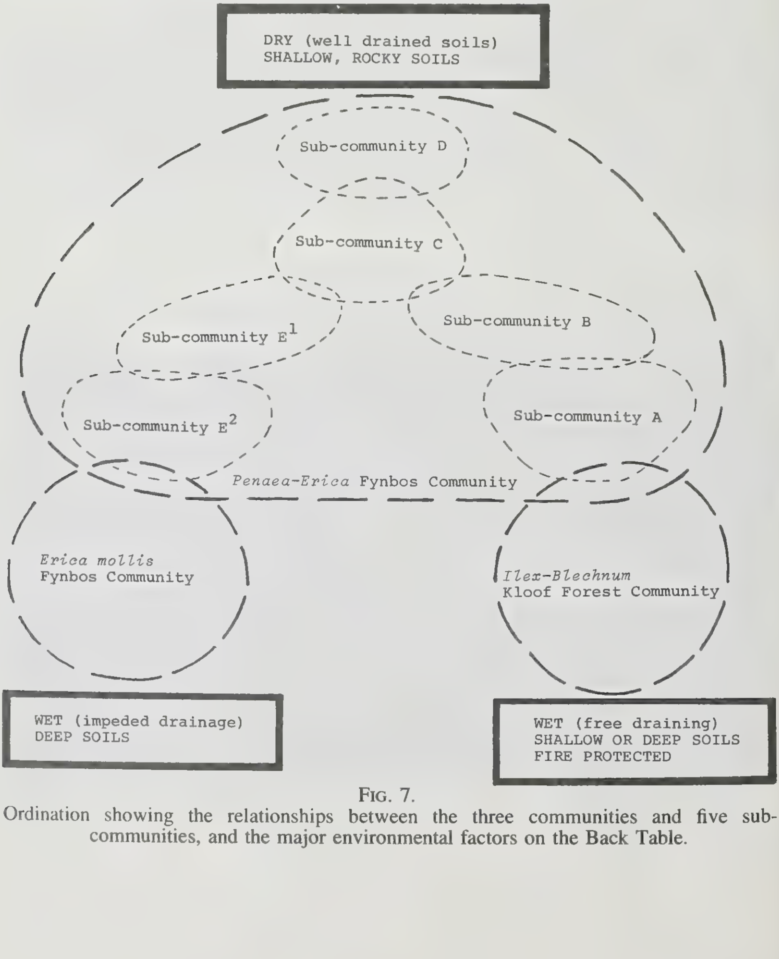

FIG. 7.
Ordination showing the relationships between the three communities and five sub-communities, and the major environmental factors on the Back Table.

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